



## **Effects of factors on the abundance of epilithic algae in mountain streams of subtropical Taiwan**

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The upstream reaches of the Dajia River are the only habitats of the Taiwanese masu salmon. Epilithic algae, the source food of grazing insects, are the main primary producers in the stream. In this study, the effects of water quality and environmental variables on the biomass of epilithic algae are examined in four monitoring sites in mountain streams over a 5-year period (2006–2010), using dynamic factor analysis (DFA). The optimal DFA model successfully described long-term dynamics of epilithic algal biomass at each monitoring site. DFA results indicate that water temperature, dissolved oxygen concentrations (DO), pH, canopy cover, and current velocity were the main factors explaining the seasonal shifts in the epilithic algal biomass. Current velocity, water temperature, DO, and NH<sub>4</sub>-N negatively affect epilithic algal biomass at most sites. However, canopy cover and pH positively control epilithic algal biomass. In warmer temperature streams, where their biomasses are higher than in colder streams, the temperature was positively correlated with epilithic algal biomasses. However, an inverse correlation was found in colder temperature streams. Taoshan West Stream and Breeding Field sites have low canopy cover where the NH<sub>4</sub>-N shows a significant effect on Chl-a biomass dynamics. In summary, the complicated habitats with different combinations of water quality and environmental variables result in different correlations between these variables and epilithic algal biomass. Understanding the dynamic relationship between environmental variables and the variability of epilithic algal biomass provides us a useful approach for evaluating and maintaining the sustainability of a healthy epilithic algae community.